A USER-INTERFACE ENVIRONMENT FOR AN ONLINE EDUCATIONAL CHESS SERVER

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ABSTRACT

This article describes an interaction and interface environment for a public, online chess server, on the web, whose main purpose is to improve chess teaching in Brazilian public schools. The vast majority of such chess online servers considerer and take for granted that users are specialists rather than learners. The solution describes in this article is inserted in an education environment, aiming at providing users with direct access to the contextually significant actions by means of strategic and operational help.

KEYWORDS

Teaching and Learning Strategies, Interfaces, Human Computer Interaction.

1. INTRODUCTION

In the present article we describe the development of an interaction and interface environment for the chess server of the Center of Chess Excellence (www.cex.org.br) – a public, online chess server on the web, based upon Free Software. The vast majority of such chess online servers are oriented towards the commercial market, and take for granted that users are specialists rather than learners, which in turn makes the access to these servers quite difficult for learners.

The game itself is not the sole purpose of the above-mentioned chess server. Indeed, its main purpose is to improve chess teaching in Brazilian public schools (comprising elementary school till high school), particularly aiming at reducing and optimising the teaching time. The main purpose of our work is to call attention to the different user’s profiles that must be taken into account when designing the server, the differences between learners and specialists, the concern towards the needs of these learners so that they are properly oriented rather than being directly exposed to the specialists’ community. We intend, therefore, to develop a community that comprises different user’s profiles (Direne et al., 2004; Feitosa and Direne, 2006).

Even though there is an interface solution for this chess server through the web, it does not fulfil the current teaching and/or learning requirements that the Brazilian Education Department established concerning chess as an extracurricular activity. Moreover, the interaction takes place almost entirely in a console window by means of command line, which, in this case, requires great cognitive effort from learner-users (which actually is the target profile of the project) excluding them from the chess community, contributing thus to an unnecessary sophistication of the environment.

The interface and interaction environment we describe here is innovative within the context of the available chess servers, both fulfilling the demands and suiting the purposes of the chess server upon which it is based. Our main thesis is that it is possible to correct the flaws of the access tools available today, and therefore help learner-users to overcome the difficulties imposed by the unnecessary sophistication of the chess community. In order to come up with a solution, we went through the literature of a number of areas. In addition to Human-Computer Interaction (HCI) e some of its supporting theories – particularly Semiotics Engineering (de Souza, 2004) –, we also looked into the state of the art discussion on Educational Informatics (EI) and, consequently, into the relevance of computer-supported educational games.
Furthermore, since the chess server in question is an online server for web games, our research was extended to educational games through the web, particularly in multi-user environments.

2. LITERATURE

2.1 Educational Informatics

Nowadays, a number of software can be considered educational software. According to (Vicari and Giraffa, 1996), an educational software must meet the needs of its users and possess pedagogic purposes. They also add that every software may be considered educational as long as its use is inserted in a context and situation of teaching-learning in which a specific methodology guides the work.

A branch of Educational Informatics that can be largely explored is the use of software of educational games. The game definition is polemic. One definition say that, game is a free activity in which one proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It is not everyday life, it is outside the process of directly satisfying needs and desires (Huizinga, 1971).

For (Vicari and Giraffa, 1996), the main purpose of an educational game is to make knowledge absorption and the work with learners significantly easier, helping to explore their cognitive skills. Spontaneity must never be sacrificed in the name of knowledge acquisition because the greatest benefit of a game is to allow learners to express their own decisions (Fröbel, quoted by Kishimoto, 1992).

The use of computer-supported games for educational purposes leads to an increase in student motivation, and teaches students to persist when faced with challenges and new tasks (Tarouco et al., 2004).

2.1.1 Educational Games through the Web and Multi-User Environments

Educational games through the web are tools that add to the teaching-learning process and provide students with data gathering and processing, asynchronous learning, real-time interaction among geographically dispersed people, as well as a dynamic scenario (Tarouco et al., 2004). Such interactive environment is called multi-user environment.

A number of computer educational games have been expanded through the web, following Internet advances, leading thus to the development of multi-user educational games; in other words, users geographically apart or not are able to interact through computational networks.

In a multi-user environment, users must interact both amongst themselves and with the system (Grudin, 1994). Educational Informatics and the area of HCI have both been joining efforts in order to build adequate environments that embody the above-mentioned features.

2.2 Chess and Educational Informatics

Teaching strategies are rather close to chess strategies, in which dialectics and self-criticism play a central role, and in which the loser profits more than the winner. From a moral point of view, chess establishes an ethical conduct through the losing and winning experiences, which in turn can be used by the teacher when analysing matches and commenting on the students’ mistakes (Sá, 1988).

Traditionally, the teaching of chess takes place through books that contain a series of schemes and specific methods associated to a set of chess positions. Generalising such methods may be quite a difficult task to students since they may not be able to find possible applications to the content they learnt.

With the help of computer science the teaching of chess may potentially be enriched since the former comprises educational features, collective use, application of heuristic uses and knowledge, among other things. However, nowadays there are only a few groups who dedicate themselves to exploring and applying computational tools and theories in order to better the process of chess teaching-learning.

2.2.1 Interface and Interactive Environments of Chess Servers on the Web

Nowadays there are a number of chess servers available on the web, among which the entire environment of the vast majority – including the interface and interactive environment – does not possess an educational
approach, focusing on other issues such as commercial interest (even charging users fees to use the server), for instance. Such servers may be considered mere substitutes of the ordinary chess board and human opponent.

The servers that do possess an educational approach are available as prototypes and do not have an interface environment through the web that meets the educational needs. Despite the attempt to stimulate the learners’ development through the game, such servers do not dispose of an environment that embodies educational approaches so as to benefit the most frequent user’s profile, namely learner. These environments were gradually developed incrementally by the chess community, whose sole concern was to allow for chess playing without thinking of making things easier on beginners. When accessing the system, these beginners face a structure and a technical, sophisticated language which at first excludes them from the community, as well as from chess learning.

3. METHODOLOGY

The chess server of the Center of Chess Excellence has been in operation for over 5 years. Its interaction through command language is based upon the international standard Free Internet Chess Server (FICS), which in turn is a protocol used for chess servers in order to offer, through the Internet, the minimum required features in order for games among various users to take place.

The interface solution described in the present article offers a graphic environment that does not require the use of commands via console. However, aiming at giving the graphical interface the full expressive potential of the FICS language and, simultaneously, fulfilling the standards found in this sort of tool and considered references by the community concerned, we elaborated a specific methodology which we shall describe next.

The methodology we used for defining the user-interface environment consisted of two elements, namely (i) studying the formal language of chess specification and (ii) empirically analysing the chess server environments available. These steps were carried out in parallel and separately by different members of the project’s HCI sub-teams, who in turn cooperatively described the functionality specification for the new version of the server. Once this initial stage was concluded, we arranged meetings with users to clear their doubts and hear their feedback, aiming at performing necessary adjustments so as to fully support the teaching of chess in schools.

3.1 Formal FICS Language

We already have a widespread formal language for playing chess through the Internet. It is a command language, and such commands were studied so as to identify their individual potential, and thus the existing possibilities, be it for the game itself or for communication among users, which is extremely important for the access of new users – chess learners.

In addition to that, aiming at identifying hierarchies and semantic associations, we classified the commands and put a conceptual model together. The outcome of such exhaustive work was, on the one hand, the context information, required for making server use by beginners easier and, on the other hand, the specification of the interface structure capable of granting direct access to actions in the various use situations.

3.2 Chess Servers on the Web

In parallel with the above-mentioned formal language study, we also performed an analysis of some of the most prominent open (free of charge) online chess servers from the point of view of both interface and interaction. The environments we analysed were those that allowed for interaction – including the game itself – by using a browser.

The main purpose of such analysis was to list the existing functionalities and identify the ones considered indispensable for a chess environment of this kind. Even though these environments do not have the same purpose as our hypothetical server – whose aim is educational –, they revealed functionalities and basic requirements that must be offered to chess players in general.
3.3 What Specialists and Server Users have to Say

The team that worked on the development of the chess server is multidisciplinary, and consists of sub-teams in charge of the Server (managed by specialists and senior users of the chess community), Database, Coding, Human-Computer Interaction and Education. This collective view, inherent to the project, allowed for the design of the interface environment with the ongoing participation of different user’s profiles in the process.

The contribution of the specialists and educators was rather significant, assisting us in the selection of terminology and identification of features necessary to the game environment so as to fulfil the objective of our project, i.e. to support the teaching of chess in schools.

As for the senior users of the server who took part in the meetings, we can say that they have been using the system since its implementation, also playing the role of system managers. Because they are thoroughly acquainted with the community, they were fully able to point out some of the usual difficulties beginners and intermediate users face during the interaction with the system. Besides, they helped us to choose the functionalities by means of a classification by relative frequency relevance of the FICS commands.

4. SOLUTION DESCRIPTION

The methodology used allowed us to develop a solution for the interface and interactive environment for the project’s chess server in accordance with main objective of the Center of Chess Excellence – of supporting chess teaching in schools. Figure 1 shows the layout of the main screen and its windows.

It is essential to point out that the entire design of the environment, including the board and pieces, was elaborated especially for the project. Figure 1 shows that we placed special emphasis on the access to context information of the community’s activities, denoting the innovating nature of this technological tool that allows for direct access to contextually significant information. This was possible thanks to the selection and remodelling of functionalities combined with the design of the interface elements, which in turn are parts of the methodology that shall be described next.

4.1 Board: the Game Environment

The board constitutes the very game environment. As we show in Figure 1, the board takes the central portion of the environment. It includes a clock for each player, the names of the players, a key of symbols concerning the colours of the pieces, a window displaying the PGN (Portable Game Notation) moves and a window that displays the punctuation during a match.
When a user invites another user to play, the environment enables them to choose the game settings, such as the use of white or black pieces, whether or not the match should count for the rating, match category, match time, among others. Another important option that is at the players’ disposal is whether or not the match should be public. When it is public, other environment users may watch it, and this is particularly useful to chess teachers, since they can play illustrative matches to instruct a group of learners.

A typical problem of online chess environments is when newcomers are instantly invited to play by ill-intentioned experienced players. This happens because such experienced users want to accumulate more victories, thus bettering their rating. This bad conduct makes the environment unfavourable for learners, discouraging them from playing. The interface solution we used to try to combat this problem is the following: the moment a beginner is invited to play by an experienced learner (which can be easily visualized through the players’ ratings), the former gets a message in his/her game settings window warning him/her of the possibly ill intention of the latter, thus avoiding the complete “massacre”.

Once the match is over, a set of specific options is displayed to users, including report an abuse (in case opponents have been immoral), add the match to favourite matches, play again with the same settings, review the game, etc. An important feature – vis-à-vis the teaching-learning environment – is the possibility to take notes during the match and then save them. This enables both user-learners to take notes of what might have been their flaws, and teachers to write comments while watching a match, so that they can use them later in class or simply make them available for students.

### 4.2 Top Contact Bar

Aiming at providing users with direct access to the contextually significant actions by means of strategic and operational help, we inserted a context bar on the top portion of the environment, as shown in Figure 1.

Thanks to the methodology we adopted, we were able to choose the most significant functionalities for the entire environment, which in turn were placed in the context bar, mostly. Each option of the bar has its respective menu of available actions for each user, as shown in Figure 2 below.

![Figure 2. Context bar menus: direct access to significant actions](image)

The first option of the context menu bar is “Ongoing matches”. The environment interface allows users to directly access the ongoing matches by clicking this button. Its corresponding menu displays the ongoing matches stored in the system, which naturally can be observed by other users. Right next to it is the “Announced matches” option, through which the interface displays a list of announced matches. The interface also allows users to have access to such matches and to accept the ones they wish to. Quick access to a certain match is possible in a rather simple way, as follows: when users want to be challenged, the interface allows them to announce a match as well as the settings chosen for such match. The third button of the context bar is entitled “Tournaments”, whereby all ongoing tournaments are displayed (also allowing users to check the ongoing matches), as well as scheduled tournaments.

Finally, the last option of the context bar is “Rooms”. The environment solution enables users to get in touch with one another through chat rooms. Users may send and receive messages to a certain user or to all users present in the chat room in which they are taking part.

Another typical flaw of the vast majority of the online chess servers is the fact that the names of the rooms do not correspond to their meaning (e.g. a help room called “channel 1”). This causes great difficulty for learner-users who are not acquainted with the environment and cannot find the appropriate place for asking for help. In order to avoid this sort of problem, our interactive environment names its rooms in accordance with their purpose. In addition to that, newcomers are directly connected to the help room when
they access the environment for the first time. This way, in case they have doubts about the environment, Helper-users can easily provide them with assistance.

Furthermore, the fact that the option “Rooms” allows for the creation of new rooms, the environment disposes of a series of different rooms, each one meeting the needs of a certain group of users. Therefore, with the help and motivation of managers and teachers, users can create rooms so as to help one another, discuss about rules and specific modalities of chess, among other things.

5. CONCLUSIONS AND FUTURE PERSPECTIVES

Departing from the initial hypothesis problem that learners have difficulty getting motivated to fully enjoy chess server environments – which is so often mentioned in the computer-based chess community –, we strived to find a theoretical basis in Human-Computer Interaction and particularly in Semiotics Engineering to develop an interface and interactive environment capable of privileging communication among and with user-learners, which in turn constituted the main objective of our server – thus attending to the needs of this specific profile.

The methodology we developed especially for building the interface had its grounds in the differential features of the project, or more specifically in the existence of a formal language (FICS) with full expressivity for the chess community, as well as in the multi-disciplinary nature of our team, which in turn allowed for the ongoing and active analysis of different potential user’s profiles all through the design process. This way, we carried out the studying, classification and modelling of the formal language in parallel, and we also performed the empirical analysis of the features of chess servers available on the Internet. Our methodology, which used alternatively the top-down and bottom-up approaches, was gradually shaped during the periodic meetings with different users, whose main purpose was to determine the importance and relative frequency of the commands, the most common terms used in the chess community, the learners’ specific needs, among other things.

Therefore, the interface and interaction environment we developed meets the needs of a community whose main concern is to privilege learner-users. Such concern becomes clear in the interface through the bar of context menus, which in turn displays the entire potential of the environment basically by means of the context information, providing users with direct access to actions semantically associated to each menu.

Future works in this area should approach the implementation of the environment (which is already being carried out), as well as the shift between competition and cooperation with educational purposes.

REFERENCES


